

Local Anesthesia in Ophthalmology

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LOCAL ANESTHESIA is still preferred by the great majority of ophthalmologists for intraocular operations. The reasons for this preference are many:

- Agitation or nausea in the immediate postoperative period, before the operative wound has become securely sealed, can be disastrous, especially following removal of cataract.
- With the patient calm and quiet after operation, the likelihood of flattening of the chambers, prolapse of the iris or rupture of wounds is reduced and hyphema is less. Vitreous pressure is lower with local than with general anesthesia, the eye is "less full" and vitreous loss is not as common.
- Bleeding when the eye is open is not as troublesome with local anesthesia.
- Secretions are better controlled and bodily functions in general are disturbed to a much less degree.
- In the immediate postoperative period the patient is better oriented, and early ambulation is possible if that is desired.
- Under local anesthesia there are fewer cardiac and pulmonary complications, and embolic phenomena are less frequent. Gartner and Billet² reported an average of 45 deaths a year under general anesthesia during eye operations performed by certified ophthalmologists. In this connection it must be borne in mind that a high proportion of intraocular operations are done on elderly, senile patients for whom general anesthesia is a greater risk.
- A few patients have a morbid fear of being put to sleep, and the related tenseness and anxiety increase the hazard of serious complications, both during and after operation.

PREOPERATIVE MEDICATION

For preoperative medication, the following routine has proven quite satisfactory in most adult patients. Two hours before operation the patient is given 0.1 to 0.2 gm. of pentobarbital sodium (Nembutal®) by mouth, then an hour later meperidine hydrochloride (Demerol®) 75 to 100 mg. and dimenhydrinate (Dramamine®) 50 to 100 mg. are administered intramuscularly. If the operation is for removal of cataracts several drops of cocaine hydrochloride (4 per cent) are instilled in the

- With local anesthesia for intraocular operations, postoperative agitation, nausea and vomiting are less frequent, which tends to reduce the number of intraocular complications. Bleeding is less troublesome, and secretions are better controlled. Fewer cardiac and pulmonary complications occur with local anesthesia.

Meperidine hydrochloride (Demerol®) and pentobarbital sodium (nembutal) remain drugs of choice in preoperative medication. Lidocaine (Xylocaine®), 1 or 2 per cent, is a most satisfactory local anesthetic for intraocular operations.

Complete akinesia of the eyelids has been achieved in every instance by a modified combination of the O'Brien and Van Lint techniques, using lidocaine 1 per cent.

Nasolacrimal procedures can be performed satisfactorily by injecting the nasociliary and infraorbital nerves with lidocaine 2 per cent.

eye at five-minute intervals when the patient arrives in the operating room.

As Atkinson¹ pointed out, the time-honored barbiturates are excellent hypnotics. They are usually quite predictable and there are relatively few side effects. Not often are nausea and vomiting associated with them, and usually they give satisfactory amnesia. However, they may cause disorientation and restlessness in elderly patients unless dosage is carefully controlled. Barbiturates also decrease the toxic side effects of local anesthetic agents.

Meperidine hydrochloride (Demerol) is a most effective analgesic. Toxic reactions are rare. It produces very little nausea and seldom vomiting when used in conjunction with local anesthetics. When given intramuscularly it reaches its maximum effect in 45 to 60 minutes and usually lasts for a minimum of two hours. It has a less depressant effect on respirations than morphine. It is also a good antispasmodic, one effect being that postoperative constipation is less likely when it is used. Another advantage is that corneal sensitivity is reduced.

Many anesthesiologists have lost faith in dramamine as an antiemetic, but I have found it satisfactory when used in conjunction with Demerol and pentobarbital sodium preoperatively.

In my experience the effect of tranquilizing drugs is unpredictable and I do not usually prescribe them unless the patient has been taking them routinely.

Before any drug is administered, a careful history concerning drug sensitivity is taken in each case. It has not been necessary to pretest patients for sensitivity as suggested by Atkinson.¹

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ADMINISTRATION OF LOCAL ANESTHESIA

Following is the technique I have used for six years to produce lid and retrobulbar akinesia and anesthesia.

Lidocaine (Xylocaine®) 1 per cent in 1:100,000 epinephrine, is employed in a modified combination of the O'Brien and Van Lint techniques. A 1½ inch 25 gauge needle is used, and 5 to 7 cc. is injected at a point 15 mm. in front of the tragus of the ear on a line from the tragus to the angle of the mouth. The needle is pressed deep into the parotid gland and to the ramus of the mandible. The skin at the site of injection is usually elevated, forming a mound 5 mm. high and 25 mm. in diameter. This injection reaches all the branches of the pes anserinus of the seventh nerve as they bend forward around the ramus of the mandible and course through the parotid gland. Next, infiltration of the anesthetic agent into a curved zone under the skin around the temporal side of the eye is carried out. The injection is started 15 mm. lateral to the external canthus and carried down below the lower eyelid to the area of the infraorbital foramen to reach the fibers of the infraorbital branch of the maxillary nerve. The needle is then directed up and slightly medially to carry the infiltration well above the brow. A small amount of lidocaine is then injected at the external canthus in case canthotomy becomes necessary. The lid margins are injected lightly to reduce the pressure sensation of the lid speculum.

With this technique, complete akinesia of the lid was always achieved.

For retrobulbar injection, lidocaine 2 per cent in 1:100,000 epinephrine is used. Ten turbidity units of hyaluronidase are added to each cubic centimeter. Two cubic centimeters of the mixture is injected into the muscle cone through the skin of the lower eyelid and the infratemporal quadrant of the orbit. A 1½ inch 25 gauge needle is used and a small amount is injected ahead of the needle as it is being pressed through the orbit to lessen the chances of piercing a blood vessel. By noting the size of the globe and its relation to the orbital rim and keeping in mind the general anatomy of the orbit I try to visualize the location of the entire muscle cone. The injection must be in the mid-conal zone and neither apical nor immediately retrobulbar. With attention to this factor, complications are much less likely to occur, akinesia and anesthesia are more effectively produced and there is less likelihood of a retrobulbar hemorrhage. The ciliary ganglion, the ciliary nerves and the nerves to the muscles are easily anesthetized by diffusion from this zone.

The next step is to inject 0.75 cc. of xylocaine 2 per cent solution into the posterior third of the superior rectus muscle through the skin of the upper

eyelid, again forcing a little of the mixture ahead of the needle as it is advanced. This completes the injections.

Adding hyaluronidase to the mixture makes the anesthetic effect start sooner but shortens the duration. Epinephrine increases the duration of the anesthesia and produces hypotony. I have not given acetazolamide (Diamox®) to any of the patients preoperatively to produce hypotony.

After the injections are completed, the globe is massaged for five minutes or longer until satisfactory hypotony and akinesia of the extraocular muscles are obtained, the vitreous pressure being directly related to the tone of the extraocular muscles. The massage, which I consider an advancement in the preparation for cataract operation, is simply the intermittent application of pressure downward and posteriorly with the two index fingers. I do not apply diffuse pressure even for so short a time as 15 seconds, lest vascular occlusion be precipitated.

In a period of six years the only complication with the method described was retrobulbar hemorrhage, which occurred in two cases. The operation was cancelled in both instances but was done later under local anesthesia without further complications. No drug sensitivity or idiosyncrasy, orbital edema or other complications occurred. Anesthesia lasted long enough in all cases.

A related procedure is a rather simple, fairly well known but often overlooked method of producing regional anesthesia by blocking the nasociliary and infraorbital nerves for procedures on the nasolacrimal drainage system. A needle is introduced into the orbit along the superonasal wall just beneath the trochlea for a distance of 15 to 20 mm., the plunger being gradually depressed as the needle is advanced. One cubic centimeter of lidocaine 2 per cent is injected. This anesthetizes all the terminal branches of the nerve—the infratrochlear, the anterior nasal and the terminal external nasal branches. Then the infraorbital nerve is blocked at the infraorbital foramen by introducing the needle just lateral to the ala of the nose and directing it up and laterally into the infraorbital foramen which is on a vertical line beneath the superior orbital notch, and discharging 1 cc. of lidocaine 2 per cent solution there. Excellent regional anesthesia is produced by this method.

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REFERENCES

1. Atkinson, W. S.: *Anesthesia in Ophthalmology*, Charles C. Thomas, Springfield, 1955.
2. Gartner, S., and Billet, E.: A study on mortality rates during general anesthesia for ophthalmic surgery, *Am. J. Ophth.*, 45:847-849, July 1958.